

## ERS312H5 Oceanography (SCI) – Winter 2019

The world's oceans cover approximately 70% of the Earth Surface and Canada has extensive coastlines along three major ocean basins. This course will provide an understanding of chemical, biological, physical and geologic aspects of the oceans. Emphasis will be placed on the geological and geophysical processes that form and shape the ocean basins and continental margins. In addition, this course will offer an insight into the paleoceanographic evolution of our planet and present day environmental threats such as pollution, habitat destruction, acidification and ocean warming. Even though this course does not include specific lab or tutorial sessions, three relevant exercises will be included. [36L]

Prerequisite: One of: ERS201H5, ERS202H5, ERS203H5, GGR214H5, GGR217H5, GGR227H5

### Instructor:

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Earth Sciences, Dept. of Chemical and Physical Sciences

Office hours: Tuesday 10 -11 a.m./Wednesday 11 a.m.-noon or by appointment

### Class Schedule:

Lectures: 9-10 a.m. Tuesday, DH3000; 1-3 p.m. Wednesday, Room DH3000

### Marking Scheme:

Term test 1	25%	January 30th
Term test 2	25%	March 6 <sup>th</sup>
Term test 3	25%	April 3rd
Term paper on Deep-Sea Drilling	10%	March 13 <sup>th</sup> (in class)
3 Exercises	15%	all due in class

Late penalty on term paper: 20% of full mark/day after 13/03.

### Missed Term Tests or Labs:

There will be no make up tests or exercises. A missed test or exercise will only be excused for cases in which the absence was entirely beyond your control (e.g. medical reasons, personal affliction), but only if proper documentation is submitted. In this case remaining tests and exercises will be reweighted accordingly (e.g. if one test has been missed, the two remaining tests together will count for 75% of grade).

There will be no prior announcement as to when exercises will be conducted. It is your responsibility to attend class regularly.

Medical Excuses: Within ONE WEEK of missed test/exercise you must submit the following to me: (1) A University of Toronto Student Medical Certificate, filled out by your doctor, and (2) a detailed letter from you requesting consideration including your name, student number, email address, date of missed test, and how it prevented you from completing your work.

Non-medical excuses: BEFORE YOUR ABSENCE, submit a letter requesting consideration including the following information: name, student number, email address, date of expected absence and a detailed description of the reason for the absence. If your absence arises in an emergency, this letter may be submitted up to ONE WEEK after the absence. Valid excuses include: emergency care of a child, parent or other family member and funerals. Reasons involving personal commitments such as vacation travel, work and routine medical appointments will not be considered.

**Term paper:**

An enormous amount of insight on the evolution of ocean basins, ocean circulation, marine life and earth's climate has been gained from investigation of marine sediment and rock cores drilled as part of an ongoing multinational deep-sea drilling program that started in the late 1960s. For your term paper you will be assigned a specific leg (cruise) of the ocean drilling program and you are expected to discuss (in your own words) the scientific goals of the drilling and the major outcomes. Volumes containing the initial results and all the data gathered during a deep-sea drilling campaign are available online. These volumes are written during or immediately following a specific research cruise, however, the major scientific findings as a result from a cruise are often published later and in peer-reviewed scientific literature. Hence, as part of your assignment you are not only expected to consult the ocean drilling volumes for the cruise assigned to you, but are also expected to search for and consult peer-reviewed literature, that use data/samples collected during the cruise, often authored by participants of the cruise. In fact, most of the major scientific advances resulting from the cruise are usually found in this peer-reviewed literature. The term paper should demonstrate knowledge of scientific principles that pertain to your subject.

- Length 3 pages (12 point, 1.5 spaced) plus or minus 1/4 page, departure from this length restriction will result in 10% penalty for each 1/4 page (this includes abstract, a maximum of 2 figures (each no larger than 1/3 of a page) and no more than 5 references, but does not include cover page)

- Paper will include an abstract (200 words plus/minus 10%), an introduction stating objectives of cruise, and main body with major findings that advanced our understanding of oceanography and list of references cited.

- By **early February** each student will be emailed the link to a specific cruise.

- All statements presented in this report are to be properly referenced; this includes citations within the text itself. This paper is to be a synthesis **IN YOUR OWN WORDS** of your subject material; where direct quotes are made source must be properly referenced.

- A "References Cited" section that lists those materials that you actually used and cited is to be given at the end. In text citations must be in the format AUTHOR (YEAR), if two authors AUTHOR and AUTHOR (Year), of >2 authors AUTHOR et al. (YEAR). Abstract does not contain citations. Citation procedures and the "references cited" section are to follow exactly the format used by the Geological Society of America (bottom of page [http://www.geosociety.org/documents/gsa/pubs/GSA\\_RefGuide\\_Examples.pdf](http://www.geosociety.org/documents/gsa/pubs/GSA_RefGuide_Examples.pdf)). Citations have to appear in text and match bibliography at end of paper. Most of your statements are not based on your own work but the work of others – this must be cited at the end of every sentence or sequence of sentences. Citations from places like Discovery Channel, BBC news or information from websites is not allowed (e.g. no reference to <http://www.....>). All Figures must be numbered and referenced. Do not use statements such as “Researchers have found...”, but rather say: NameofResearcher (Year) has found....

- Marking scheme applied to term paper: Abstract (10%), Introduction stating objectives of cruise (15%), Main body with major findings (50%), Citation/references (10%), Formatting, grammar, style (15%)

**Literature:**

No textbook is required for this class even though it is highly recommended to consult the below book, which is on reserve at the library or can be purchased. A handout will be posted on Quercus prior to each lecture, containing an outline of topics discussed as well as the most relevant figures. It is your responsibility to follow the lectures and fill in relevant information on the handouts provided.

Trujillo, A.P. and Thurman, H.V. (2018) Essentials of Oceanography, 12<sup>th</sup> edition, Pearson, Boston, 597p. – ISBN 10: 0-134-07354-1; ISBN 13: 978-0-134-07354-5

**Course outline:**

Topic 1. Introduction – what is Oceanography

Topic 2. Ocean Exploration

Topic 3. Plate Tectonics and Ocean Floor

Topic 4. Topography of Ocean Basins

Topic 5. Ocean Sediments

Topic 6. Seawater and Ocean Circulation

Topic 7. Tides and Water Dynamics

Topic 8. Pelagic and Benthic Marine Life

Topic 9. Biological Productivity

Topic 10. Marine Pollution